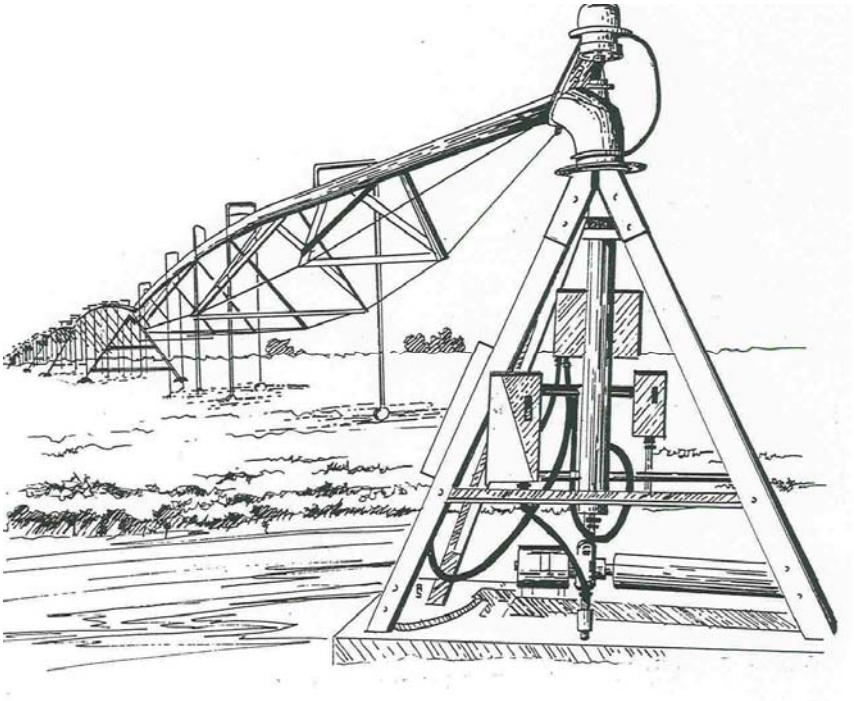
Wastewater Land Application Operators Study and Reference Manual



Idaho Department of Environmental Quality

and

Wastewater Land Application Exam & Training Development Committee

October 2005

This page intentionally left blank for correct double-sided printing.

Wastewater Land Application Operators Study and Reference Manual

Idaho Department of Environmental Quality

and

Wastewater Land Application Exam & Training Development Committee

October 2005

This page intentionally left blank for correct double-sided printing.

Acknowledgements

The Wastewater Land Application Permit Program and the wastewater treatment and collection system requirements for licensed operators are administered by the Idaho Department of Environmental Quality. Individuals who operate wastewater land application systems are required to hold two licenses: a wastewater treatment license and a wastewater land application license. The Idaho Bureau of Occupational Licensing administers the testing and licensing of individual wastewater operators.

This manual is a combination of guidance materials gathered from various technical resources, with input and expertise from the Idaho Department of Environmental Quality wastewater engineering and technical staff.

Special thanks are extended to the North Carolina Department of Environment and Natural Resources for allowing the use of their *Spray Irrigation Systems Operators Training Manual* as an immensely valuable starting point in the production of this manual.

Very special thanks go to Larry Waters, Department of Environmental Quality and Claudia Gaeddert, CLPE Consulting Engineers—both Wastewater Land Application Exam and Training Development Committee members—who were the primary authors of this study and reference manual.

This page intentionally left blank for correct double-sided printing.

Table of Contents

List of Figures

List of Tables

List of Equations

Introduction

The goal of a wastewater land application (WLAP) system is to provide a method of wastewater treatment that protects the following:

- public health
- the environment
- waters of the state, including surface water and ground water

Land application systems are recognized by the State of Idaho Department of Environmental Quality (DEQ) and the U.S. Environmental Protection Agency (EPA) as beneficial wastewater re-use systems. Two benefits of using land application technology with wastewater are (1) eliminating the need for wastewater discharge into a surface water body and (2) providing wastewater as the primary source of irrigation water for nutrient utilization by crops that are grown and harvested on land application sites. Furthermore, a properly sited and operated wastewater land application system offers exceptional wastewater treatment and renovation as well as a source of aquifer recharge in some instances.

However, as with any wastewater treatment process, mismanagement can result in negative consequences. Over-application of wastewater to the land can result in runoff or leaching (downward movement of pollutants) and potential contamination of surface waters and/or ground water. Nutrients, metals, pathogens, salts, and other waste elements in the wastewater may cause environmental problems or health concerns if not properly managed.

Purpose of This Manual

The purpose of this manual is to provide operators of wastewater land application systems with the basic understanding needed to operate these systems in an efficient and environmentally sound manner. However, this manual is not intended to provide all required details for the complete evaluation and management of a wastewater land application system; there are many valuable reference materials that have been published on this subject, and these can provide more detailed information on the various topics discussed. Some of these materials are referenced in this manual; you are encouraged to consult additional resources as you continue to work as a wastewater land application operator.

This Manual and the Law

This manual presents material consistent with the laws, rules, and technical guidance for Idaho's wastewater land application program that existed at the time the manual was written. It is possible, indeed likely, that there will be changes in these laws and technical guidance, so it is important to stay up-to-date.

Although the organizations and government agencies involved in wastewater land application system operator certification will try to inform individuals who own and operate these systems of any changes, as they occur, you, ultimately, are responsible for ensuring that you are operating in compliance with current laws and rules.

If you have questions about wastewater land application systems, please contact the Idaho Department of Environmental Quality. If you have questions about becoming licensed or maintaining an existing license as either a wastewater treatment operator or as a wastewater land application operator, please contact the Idaho Bureau of Occupational Licenses.

How This Manual Was Developed

A committee of experts in the wastewater, regulatory, soils, agronomy, engineering, and associated fields developed the training materials for this manual. The manual is based on a list of topics and issues—referred to as *Needs-to-Know Criteria*—the committee determined each operator of a land application system must be knowledgeable about to perform the operator's job at a minimum level of competency. The manual and the associated training program explain and demonstrate each *Needs-to-Know Criteria*, such that, upon completion of the training, the operator should have the knowledge and the tools to effectively operate a wastewater land application system.

Updates to This Manual

This manual will be periodically updated to reflect changes in laws and technology. For example, interest in odor reduction from wastewater irrigation fields is increasing, thereby increasing the interest in using application equipment that distributes wastewater at or close to the ground surface. Distribution techniques, such as low-drop nozzles on center pivot equipment and drip irrigation systems, meet some of these needs in special cases, but this manual cannot cover every possible type of hardware that is used in the field.

The basics of wastewater treatment, distribution, and site operation and management are presented in some detail, as these are applicable to all sites. Special and unique systems may be only briefly mentioned; operators of such systems are encouraged to obtain more specific operation and maintenance information from the system manufacturer, designer, and/or installer.